

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

FEDERAL REPUBLIC OF GERMANY
GERMAN PATENT OFFICE
PATENT NO. 19,814,695 C2

Int. Cl.⁷:
A 61 M 1/00
A 61 M 1/14
A 61 M 5/44
A 61 J 1/05
A 61 M 1/28

Filing No.: 19,814,695.7-35

Filing Date: April 1, 1998

Date Laid-open to Public Inspection: October 14, 1999

Date of Publication of the Grant of the Patent: September 13, 2001

CARTRIDGE FOR CONVEYING FLUIDS, IN PARTICULAR DIALYSIS FLUIDS,
DIALYSIS DEVICE, AND METHOD FOR CONVEYING, BALANCING, DOSING, AND
HEATING A MEDICAL FLUID

Inventors: Rainer Dönig
60489 Frankfurt, Germany;
Wolfgang Schulz
66606 St. Wendel, Germany

Patent Holder: Fresenius Medical Care Deutschland
GmbH
61352 Bad Homburg, Germany

Agent: Attorneys and Patent Attorneys
Lorenz, Seidler, Gossel
80538 Munich, Germany

Prior printed publications taken into
consideration to evaluate the patentability: DE 3,736,714 A1
WO 9,708,074 A2

Opposition may be filed within 3 months after publication of the grant of the patent.

* * *

Claims

1. A cartridge (10) for conveying fluids, in particular dialysis fluids, with connector elements (2,4,6) for the connection of fluid bags and with lines leading to the patient or to the dialysis device, with a minimum of one conveying chamber (20,20') with an inlet and an outlet (22,22',24,24'), with lines (30,40,50,50') for carrying the supplied and conveyed fluids, with at least some segments of the walls of the lines (30,40,50,50') being designed so as to ensure that the lines (30,40,50,50') can be closed off by exerting a pressure that acts on the walls, characterized by the fact that the cartridge (10) has at least one region (100,100') in which the lines (50,50') are disposed to ensure that the medium contained in the lines (50,50') can be heated to a predetermined temperature by means of a heating device that is located on the outside of the cartridge (10).

2. The cartridge (10) as in Claim 1, characterized by the fact that the cartridge (10) comprises a basic body (12) and one or a plurality of plastic films (60) which at least partially cover the basic body (12) and which are connected to the basic body (12), with the walls of the lines (30,40,50,50') and of the conveying chamber (20,20') being formed by the basic body (12) and the plastic films (60).

3. The cartridge (10) as in Claim 2, characterized by the fact that the plastic film (60) extends along both sides of the basic body (12).

4. The cartridge (10) as in Claim 2 or 3, characterized by the fact that one surface of the basic body (12) is completely covered by a plastic film (60).

5. The cartridge (10) as in any one of Claims 1-4, characterized by the fact that two conveying chambers (20,20') are provided.

6. The cartridge (10) as in any one of Claims 1-5, characterized by the fact that the lines (50,50') have a spiral form at least in the heatable region (100,100') of the cartridge (10).

7. The cartridge (10) as in Claim 6, characterized by the fact that regions (100,100') with lines designed in a spiral form extend along both sides of the basic body (12).

8. The cartridge (10) as in Claim 7, characterized by the fact that the regions (100,100') located on different sides of the basic body (12) are connected to each other by a hole located in the basic body (12).

9. The cartridge (10) as in any one of Claims 2-8, characterized by the fact that the basic body (12) consists at least in part of a synthetic material.

10. The cartridge (10) as in any one of Claims 2-9, characterized by the fact that the basic body (12) is fitted with mounting devices for mounting measuring transducers.

11. The cartridge (10) as in any one of Claims 1-10, characterized by the fact that provision is made for a line that leads to the patients and a drainage hose, said line and drainage hose are undetachably connected to the cartridge (10).

12. A dialysis device, in particular for carrying out peritoneal dialysis as well as hemofiltration and plasma filtration procedures, with a recess or a device for holding a cartridge (10) as in any one of Claims 1-10 and with a pump unit for activating the conveying chambers (20,20') of the cartridge (10), characterized by the fact that provision is made for a heating device which is located in the region of the recess or the device for holding the cartridge (10).

13. The dialysis device as in Claim 12, characterized by the fact that the heating device has surface heating elements.

14. The dialysis device as in Claim 12 or 13, characterized by the fact that the heating device extends along both sides of the recess or device for holding the cartridge (10) so as to make it possible for the cartridge (10) to be heated on both sides.

15. A method for conveying, balancing, dosing, and heating a medical fluid, characterized by the fact that a fluid, which, is conveyed in any one of Claims 1-11, through lines (30,40,50,50') and through a minimum of one conveying chamber (20,20') of an exchangeable cartridge (10), simultaneously receives heating energy with the heating of the fluid taking place in the lines (50,50') and being mediated by a heating device that is located outside of the cartridge (10).

16. The method as in Claim 15, characterized by the fact that the fluid is first carried through the conveying chamber (20,20') and is subsequently heated in a region (100,100') in which lines (50,50') are located.

17. The method as in Claim 16, characterized by the fact that the heating takes place in a region (100,100') in which the lines (50,50') are designed in a spiral form.

18. The method as in one of Claims 15-17, characterized by the fact that the fluid is first carried through a minimum of one conveying chamber (20,20') of the cartridge (10) and is heated in lines (50) that are located on one side of the cartridge (10), with the fluid subsequently being conveyed to the other side of the cartridge (10) and with further heating taking place in the lines (50') that are located on this other side of the cartridge (10).